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EXAMINER

POLYANSKY, ALEXANDER

ART UNIT

PAPER NUMBER

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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usptomail@smiplaw.com



### **DETAILED ACTION**

Claims 1, 4-9, and 11 remain for examination, where claims 1, 4-7, and 11 have been amended.

#### ***Status of Previous Objections/Rejections***

The drawings objection under 37 CFR 1.83(b) has been withdrawn in view of the submission of the corrected drawings filed on September 16, 2010.

The 35 U.S.C. 112, second paragraph rejection of claim 8 has been withdrawn in view of the amendment to claim 8 specifying its dependency to claim 7 filed on September 16, 2010.

#### ***Information Disclosure Statement***

The information disclosure statement filed August 30, 2010 fails to comply with 37 CFR 1.97(c) because it lacks a statement as specified in 37 CFR 1.97(e). It has been placed in the application file, but the information referred to therein has not been considered.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1, 4-9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stephenson US 6,866,835 in view of Huebler et al., US 3,442,620 (incorrectly referred to as “Schora” previously).**

**Regarding claim 1**, Stephenson teaches the non-electrolytic energy production by dissociating H<sub>2</sub>O molecules at or near a reactive or catalytic surface (column 3, lines 11-67).

Stephenson teaches a first reactor with H<sub>2</sub>O as the feed material (claims).

Further Stephenson teaches a reactor with the following structural features of lines 5-11, comprising (col. 5, lines 48-59)

an electronegative half cell reaction producing hydrogen;

a first electropositive half cell reaction having a sufficient potential to drive the electronegative half cell reaction; and

a second electropositive half cell reaction all occur;

wherein said first and second electropositive half cell reactions are combined with said electronegative half cell reaction to produce hydrogen and/or energy production from the feed material.

Stephenson does not explicitly teach a second reactor as claimed in line 3, and including the step of introducing steam into the second reactor as claimed in claim 1 lines 13-17.

However, in a system similar to Stephenson, wherein production of hydrogen is taught, Huebler teaches production of hydrogen via steam-iron process (title) in a non-electrolytic system in order to produce and deliver the steam necessary for the non-electrolytic process in the second reactor to maximize the efficiency of the energy output from the first reactor and input into the second reactor by promoting the self-activating reaction with the aid of steam.

It would have been obvious to a person of ordinary skill in the art to combine the reactor of Stephenson with the reactor of Huebler to make two reactors in view of the teaching of Huebler in order to make more hydrogen in the second reactor and further it would have been obvious to modify the system of Stephenson with the catalytic reactor of Huebler in order to produce and deliver the steam necessary for the non-electrolytic process in the second reactor to maximize the efficiency of the energy output from the first reactor and input into the second reactor by promoting the self-activating reaction with the aid of steam from the first reactor of Stephenson (Huebler figs, tables, and etc.).

With respect to the amended feature in claim 1 line 15 “as the sole energy input to provide the necessary activation energy,” Stephenson in view of Huebler teaches feed steam at controlled temperature and pressure enters the reactor and exits as hydrogen and unreacted steam, which meets the amended feature of claim 1 line 15. Further with regard to the amended features of lines 13-17, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (see MPEP 2114) and even further, expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim (see MPEP 2115).

**Regarding claim 4**, Stephenson in view of Huebler teaches the half cell reaction requires a catalytic surface (Huebler title, abstract, etc.).

**Regarding claim 5**, Stephenson teaches instantly claimed oxidation of species selected from Groups I & II metals, binary and ternary hydrides, amphoteric elements, and etc. (column 4, lines 15-21 and claims 6, 7, 9, 10).

**Regarding claim 6**, Stephenson in view of Huebler does not specify both reactors include the features as claimed in lines 2-4. However, because Stephenson teaches an electropositive half-cell reaction involving a metal organic complex as stated in the rejections of claims 1 and 4-5, it would be obvious to one of ordinary skill in the art to duplicate the reactor of Stephenson in order to make more hydrogen as is already taught in Stephenson (Stephenson claims, etc.). See MPEP 2144.04(VI)(B).

With regard to the claimed limitations in lines 3-4, "capable of changing configuration to release... co-ordination number," while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (MPEP 2114) and even further, expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. See MPEP 2115. Therefore, selecting the half cells, providing a catalytic surface, and other such process limitations do not impart patentability because they are drawn to the use of the apparatus rather than to its' structure.

**Regarding claims 7-8**, Stephenson teaches oxidizing materials such as gallium thereby forming a semiconductive material (column 4, lines 15-21 and claims 6, 7, 9, 10, col. 8, line 14), which is a composite of gallium and oxide such as a  $\text{Ga}_2\text{O}_3$ , and which further meets the claimed feature of claim 8.

**Regarding claim 9**, Stephenson teaches an inbuilt heat exchange system (col. 7, lines 32-33). With regard to the claimed limitations of lines 2-3 "that can be used... exothermic chemical reaction(s)" while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (see MPEP 2114).

**Regarding claim 11**, Stephenson in view Huebler teaches all the structural features as claimed in claims 1 and 4-9. With regard to the claimed limitation in lines 1-5 of claim 11, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (see MPEP 2114).

### ***Response to Arguments***

Applicant's arguments filed February 25, 2009 have been fully considered, but they are not persuasive.

#### **Arguments are as follows:**

a. At page 7 par. 1 of the Remarks, Applicants submits that there is no motivation to combine Stephenson with Huebler. In particular, Huebler discloses the steam-iron process, but the claimed invention, at paragraphs 0018-0021, criticizes the steam-iron process for poor efficiency and production of unwanted by-products. Therefore, one ordinarily skilled in the art would not have combined a steam-iron process (e.g., Huebler) with the disclosure of Stephenson to reach the claimed invention.

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b. There is also no suggestion either in Stephenson or Huebler or the two references taken together to combine two reactors in a way that the output of the first reactor feeds the second reactor as the sole energy input to the second reactor.

c. Huebler does not disclose a catalytic process as asserted by the Examiner in his rejection of dependent claim 4. The Examiner's citation is to Huebler's abstract, which only cites to the regeneration of iron after its oxidation. However, this is not by itself a catalytic reaction. There is also no reference in Stephenson to a catalytic reaction, so none is disclosed or suggested in the cited art.

d. The Examiner asserts, in his rejection of dependent claims 7 and 8, that the disclosure in Stephenson, in view of Huebler, discloses a semiconductive material such as gallium or gallium oxide. These are not, per se, semiconductive unless further treated or combined, and there is no other disclosure or suggestion of semiconductor behavior in Stephenson or Huebler.

e. Finally, there is no disclosure or suggestion in Stephenson or Huebler of a surface reaction as recited in dependent claim 11. In sum, there is no suggestion or teaching in Stephenson or Huebler to combine the two references.

***In response***, with regard (a.) to the alleged disadvantages of the steam iron process as asserted in the argument above, the argument is not persuasive for two reasons. First, while the Applicant describes the disadvantage of the process in par. 19 of the instant spec., the Applicant also brings out the advantages in the same breath, such as the clean hydrogen production.



Second, the argument is not commensurate with the scope of the invention, because Applicant does not claim steam iron process, the Applicant claims a system.

In all, there is no reason why one of ordinary skill in the art would not look to combine the teachings of Stephenson and Huebler to meet the claimed subject matter as stated above.

b. With regard to the asserted “no suggestion to combine two reactors in a way that the output of the first reactor feeds the second reactor as the sole energy input to the second reactor”, the Examiner provided suggestion and motivation to combine the two reactors, i.e. Stephenson and Huebler. As stated above, it would have been obvious to a person of ordinary skill in the art to combine the reactor of Stephenson with the reactor of Huebler to make two reactors in view of the teaching of Huebler in order to make more hydrogen in the second reactor and further it would have been obvious to modify the system of Stephenson with the catalytic reactor of Huebler in order to produce and deliver the steam necessary for the non-electrolytic process in the second reactor to maximize the efficiency of the energy output from the first reactor and input into the second reactor by promoting the self-activating reaction with the aid of steam from the first reactor of Stephenson (Huebler figs, tables, and etc.).

c. Regarding the alleged lack of teaching of a catalytic process in Huebler, the Examiner is not persuaded. Huebler’s steam iron process is the quintessential catalytic reaction, wherein iron is the catalyst. Besides, whether Huebler teaches a catalytic reaction is immaterial, the instant claims are drawn to a system, i.e. apparatus.

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Functionality in the apparatus claims bare no patentability. Apparatus distinguishes over the prior art structurally. See MPEP 2114.

d. Applicant alleges that gallium oxide is not, by itself, a semiconductive material. This is inaccurate. Many artisans in the field have referred to gallium oxide as a semiconductor, for example, Hoffman US 2006/0086936 in par. 12 and etc., or Braddock US 2006/0076630 in the abstract, for example.

Despite this, claims 7 and 8 do not recite any structural features; and therefore, as stated above, it is immaterial whether Stephenson in view of Huebler meets the features and the semiconductive material.

e. The Examiner's position regarding claim 11 is as stated above. The Examiner's position regarding the functionality of the apparatus claimed is as stated above. Please refer to paragraphs 2114 and 2115 of the MPEP.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER POLYANSKY whose telephone number is (571)270-5904. The examiner can normally be reached on Monday-Friday, 8:00 a.m. EST - 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica L. Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander Polyansky/  
Examiner, Art Unit 1735

/Jessica L. Ward/  
Supervisory Patent Examiner, Art Unit 1735

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